Characteristics of Woody Stems

Purpose: To study the external structure of a woody stem and the structure of a bud and to demonstrate the apical dominance in the terminal bud.

You are probably aware that the stems of all trees or shrubs are not identical. An examination of woody stems will reveal that they vary from species to species in external form, size, and internal structure. Woody stems have excellent adaptations for dormance and are indicators of seasonal changes. Woody stems remain alive and active for more than two years. Their surfaces are covered by cork, and their external structures are very conspicuous. Examination of the external structure of the woody twig reveals leaf arrangement, growth of previous years, and how many branches will form in the next season.

Procedure and observations:

Part 1: External structure of a woody twig

Examine one of your twigs closely with a hand lens. The buds are the most conspicuous structures on a dormant stem. Locate the terminal bud at the top of the twig. Notice the bud scales covering the growing point within the bud. Locate the series of rings encircling the twig some distance below the terminal bud. These are bud-scale scars left where the scales of the terminal buds of the previous year were attached. The portion of the twig between the terminal bud and the first bud scale scar marks the growth of the previous season. The growth of the season before that and other seasons can be observed by measuring between the bud-scale scars.

1. Count the sections between bud-scale scars and determine the age of your twig.

2. Has growth in length occurred the same rate each year?

3. Why?

At intervals along the twig, you will find circular, oval, or shield shaped leaf scars, which mark the point of attachment of leaf petioles from the previous season. Leaf scars are located at the nodes.

4. Examine your twig and determine how many leaf scars are located at a node.

5. Classify the leaf arrangement as opposite, alternate, or whorled.

6. Examine the twig and determine the number of nodes produced for each growing season (the space between two nodes is called an internode.)

7. Is the same number of nodes produced each growing season?

Examine a leaf scar and notice minute dots called bundle scars, which show the location of the xylem and phloem that carried water and minerals from stem to leaf.

8. Do all the leaf scars have the same number of bundle scars and is the arrangement the same?

Look for lateral buds located along the sides of the stem. These are smaller than the terminal bud and are usually different in shape. Lateral buds situated above the leaf scars are axial buds. Examine the internodes for tiny pores called lenticels. These are especially common in younger bark.

9. Describe the form and location of the lenticels.

10. What is the function of the lenticels?

Take a picture of the woody twig and label: terminal bud, axial bud, bud-scale scars, bundle scar, leaf scar, lenticel, node, and internode.